

REMARKS

Summary of Changes Made

The Application was filed with 10 claims. All claims are amended herein for clarity, and new claim 11 is added claims numbering up to 8 were later added. Changes include, for example, amendment to proper Markush language, or use of “wherein.” Claim 3 is canceled herein. Accordingly, claims 1, 2, and 4-11 (10 claims) are pending in the application. No new matter has been added.

Specification Objections

The Examiner finds the terms “deep-drawn,” and “cohesive electrode” to be unclear and requests clarification and correction. Similarly, the Examiner believes that the title of the invention is not descriptive and requests a descriptive title. The Examiner also believes that “cohesive electrode 1” on line 24 of page 1 should be replaced with “cohesive electrode 2,” which amendment has been made.

The terms “deep-drawn” and “cohesive” are both clear to the skilled artisan. As used herein, “cohesive” is meant to be the opposite of “intermittent”, i.e, the term “cohesive” denotes layers that do not have any gaps.

The title has been amended to Electroluminescent System with Transparent Electrodes. It is believed the specification objections have been overcome.

Claim Objections

Claims 1, 3, 7 and 10 are objected to for several informalities. With respect to claims 1 and 7, the Examiner states that “luminescent dielectric” and “light layer” have been used interchangeably. In claim 3 the Examiner finds the limitation “the electrode lying on the front” to be unclear and requests clarification. Similarly, the Examiner finds “rear of the electroluminescence device” to be unclear, as it is not clear which side of the EL device is intended to be the “rear side.”

For additional clarity, the term “luminescent layer” has been used to replace “light layer” and “luminescent dielectric”.

Claims 1 and 7 have been amended to supply antecedent basis for the phrase “large surface.”

The objection concerning the term “the electrode lying on the front” has become moot since claim 3 has been canceled.

Claim 10 has been amended to remove the offending language - “rear.”

It is believed all claim objections have been overcome.

Claim Rejections – 35 U.S.C. 112, Second Paragraph

Claims 1-6 and 8, 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite. In claim 1, because “the common electrode” lacks antecedent basis, the claim is indefinite.

Claim 3 is canceled rendering the rejection thereof moot, while claim 1 is amended herein to eliminate the offending language, thus mooting the rejection.

In claim 5, the Examiner finds the language “two sections 28, 29” to render the claim indefinite, and considers the curved portions of the bottom plane of the EL display as shown in Fig. 5 to correspond to the language in question.

The Examiner will note that claim 5 has been amended to refer to two surfaces which form an angle of 90°, thus overcoming the rejection.

In claim 8 the limitation “the light layer is designed as a cohesive layer” is unclear.

Claim 9 recites the limitation “the free surface” for which there is no antecedent basis.

Claim 8 has been amended to read, simply, “the light layer is a cohesive layer,” while claim 9 has been amended to read, pertinently, “outermost surfaces of the outermost luminescent layers.”

All of claims 1, 2, 4-6, 8, and 9 are clear and precise based on the foregoing amendments. Withdrawal of the rejection is respectfully requested.

Claim Rejections – 35 U.S.C. 102(b) (Eguchi)

Claims 1, 3, 4 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. 4,741,976 to Eguchi, et al., (“Eguchi”). Regarding claim 1, The Examiner contends that Eguchi discloses an EL system comprising an EL device having a first electrode 3, two luminescent dielectric layers 4 and 5 on each surface of the electrode 3 such that at least one luminescent

layer is transparent and a second electrode 2 on the surface of the luminescent layer 5 faces away from electrode 3.

Regarding claim 3, Eguchi discloses electrode 2 lying on the luminescent layer 5, the electrode being made of transparent ITO. Regarding claim 4, Eguchi allegedly discloses that luminescent layers 4, 5 are made of material that emits light at different wavelengths. Regarding claim 6, Eguchi allegedly discloses that the EL device comprises a device to generate an electrical field by application of voltages across the electrodes so as to control the luminescent layers.

Claim 3 has been canceled thus rendering the rejection thereof moot.

Claim 1 is amended to indicate that the electroluminescent device can be activated by using alternating voltage. This feature is evident to the skilled artisan from Figures 1 and 2 which show a source for an alternating voltage with 100 volt and 400 hertz (11, 12 and 21) in combination with paragraph [0015] and [0016] of the specification. The feature that both the electrodes (2, 5, 6) and the luminescent dielectric layers (3, 4) are transparent is evident from Figures 1 and 2 in combination with paragraph [0013] of the specification, which give the direction of the outgoing light. Claim 1 is thus patentable over Eguchi. Claims 4 and 6 are also patentable over Eguchi as they depend from claim 1.

An object of the presently claimed invention is to provide electroluminescent displays which allow for bilateral emission of light. This object is solved by the provision of an electroluminescent display according to claim 1. Claim 1 discloses electroluminescent displays which can be activated by an alternating voltage comprising both electrodes and luminescent dielectric layers which are transparent. Eguchi discloses organic light emitting devices which are activated by direct voltage.

OLEDs and electroluminescent devices which are activated by an alternating voltage represent two different fields of technology so that those skilled in the art would not apply the Eguchi references when faced with the object of the invention.

Claim Rejections – 35 U.S.C. 102(b) (Burrows)

Claims 1-4 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. 5,917,280 to Burrows, et al., (“Burrows”). Regarding claim 1, Burrows discloses an EL system comprising an EL device having a first electrode 63. Two luminescent dielectric layers 62, 64

are allocated on each surface of the electrode 63 such that at least one luminescent layer is transparent and a second electrode 61 on the surface of the luminescent layer 62 faces away from the electrode 63.

Regarding claim 2, Burrows discloses more than two (62, 64, 68) transparent light layers are lying above each other and between each pair of light layers (62 and 64 or 64 and 68) a transparent electrode and each of the free large surfaces of the outside light layers are fitted with an electrode.

Regarding claim 3, Burrows discloses in Fig. 2 that electrode 61 lying on the front of the EL device is made of transparent ITO. Regarding claim 4 Burrows discloses the luminescent layers 62, 64 made of material which can emit light at different wavelengths. Regarding claim 6 Burrows discloses that the EL device comprises a device for generation of electrical field by application of voltages V_B , V_G , V_R across the electrodes so as to control luminescent layers emitting light.

Claim 3 has been canceled thus rendering the rejection thereof moot. The amendments to claim 1 as noted in the previous section serve to patentably distinguish it from Burrows. Claims 2, 4, and 6 are also patentable over Burrows as they depend from claim 1.

Claim Rejections – 35 U.S.C. 102(b) (Kishii)

Claims 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. 5,837,390 to Kishii, et al. Regarding claim 7, Kishii discloses an EL system comprising an EL device with at least one layer of luminescent dielectric 3 having electrodes 1,5 allocated to each of the large surfaces of the light layer, the electrodes being designed as set of parallel strips of electrically conductive material, where different sets are perpendicular to one another and a control device is provided so that the electrode strips are connected individually to an energy source.

Regarding claim 8, Kishii discloses that the light emitting layer 3 is a cohesive layer, emitting light when voltage is applied between two top and bottom electrodes perpendicular to one another.

The Examiner will note that claim 7 has been amended in a fashion similar to claim 1. In particular, the electroluminescence device is activated by alternating current, and includes transparent electrodes and dielectric layers. Kishii fails to disclose such limitations.

Kishii discloses organic light emitting devices which are activated by direct voltage. OLEDs and electroluminescent devices which are activated by an alternating voltage represent two different fields of technology so that those skilled in the art would not apply the Kishii reference when faced with the above identified object.

Claim Rejections – 35 U.S.C. 103(a) (Eguchi/Krafcik)

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eguchi in view of U.S. 6,465,951 to Krafcik, et al., ("Krafcik"). The Examiner admits that Eguchi fails to disclose that EL device has at least one point with a three-dimensional deformation, that this deformation has a radius which is less than 1 mm, and that at this deformed point are connected at least two sections 28, 29 of the EL device, between which extends an angle which can amount to 90°.

Accordingly, the Examiner cites Krafcik as disclosing EL lamps formed on a flexible substrate including a point having a three-dimensional deformation with a small radius of deformation, and at this deformed point are connected two points making an angle. Krafcik teaches that this configuration provides a lamp with any desired three-dimensional shape maintaining operational integrity. The Examiner concludes that it would have been obvious to modify the EL device of Eguchi formed on flexible substrate such that it has a three-dimensional deformation with small radius of deformation to which are connected two points making an angle of 90°. The Examiner believes that the Eguchi invention as modified by the teachings of Krafcik, discloses the claimed invention except that the radius of deformation is less than 1 mm and two points connected to the deformation point making an angle of 90°. The Examiner believes this is optimization only, which is within the routine skill of an artisan in the field.

The Examiner has used the general teachings of the Krafcik reference (i.e., a point of deformation) with no specifics therein to presume that all possible deformation radii and angles are possible through routine experimentation. The mere disclosure of a parameter does not constitute a disclosure of all possible values of that parameter, or even of any particular value.

Krafcik fails to disclose the limitation that both the electrodes and the luminescent layers are transparent, a limitation now found in claim 1, from which claim 5 depends.

Krafcik does not disclose that the electroluminescent display described therein is transparent, that is both the electrodes and the luminescent dielectric layers are transparent. Thus, the skilled artisan does not learn from Krafcik that by using transparent electrodes and

transparent luminescent dielectric layers an electroluminescent display can be obtained which allows for the bilateral emission of light. In particular, those skilled in the art do not get any hint from Krafcik as to the nature of suitable materials which can be applied for making transparent electrodes and transparent luminescent layers which allow for the bilateral emission of light.

Based on the foregoing, Applicants respectfully submit that claim 5 is non-obvious in view of all cited prior art.

Claim Rejections – 35 U.S.C. 103(a) (Shen)

Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. 5,932,895 to Shen, et al., (“Shen”). Regarding claim 7, the Examiner contends that Shen discloses an EL system comprising an EL device with at least one layer of luminescent dielectric 207, an electrode 206, 209 allocated to each of the large surface of the light layer, the electrodes made of conductive material, one (209) being perpendicular to the other (206) and a control device provided so that electrode strips can be connected individually to energy source.

The Examiner admits that Shen fails to explicitly teach sets of parallel strips of electrodes for the electrodes perpendicular to each other. The Examiner alleges that Kishii provides evidence that it is well known in the art to provide sets of parallel strips of electrodes to be used on each side of the luminescent layer for providing a large area of EL display in matrix form.

Regarding claim 8, Shen discloses the light layer is a cohesive layer. Regarding claim 9 Shen discloses (Fig. 2; claim 5) that the EL device has several transparent light layers of luminescent dielectric (204, 207, 211) lying above one another such that they emit light of different wavelengths and between each pair of light layers is arranged a strip electrode where the surfaces of the outside luminescent layers 203, 211 each has a strip electrode. Regarding claim 10, Shen discloses a reflective layer (cap) 213 located at the rear of the EL device and the reflected surface of this layer faces luminescent layers of the EL device.

New Claim

New claim 11 is based on paragraph [0022] of the specification. The cited prior art, singly or in any combination fails to disclose an electroluminescence system having an electroluminescence device comprising three transparent luminescent layers stacked one above the other, including all limitations of claims 1 and 2.

Conclusion

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge the same to Deposit Account No. 18-0160, Order No. GIL-17254.

Respectfully submitted,

RANKIN, HILL & CLARK LLP

By: / Christopher J. Korff /
Kenneth A. Clark
Reg. No. 32,119
Christopher J. Korff
Reg. No. 55,342

23755 Lorain Road - Suite 200
North Olmsted, Ohio 44070-2224
(216) 566-9700
docketing@rankinhill.com